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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,899	12/04/2006	Benny H. Johnson	313688001US1	4474

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EXAMINER	
CHEN, XIAOLIANG	
ART UNIT	**PAPER NUMBER**
2841	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,899	JOHNSON, BENNY H.	
	Examiner	Art Unit	
	XIAOLIANG CHEN	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 16* is/are rejected.

7)☒ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11-07-05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 3, 4 and 10 are objected to because of the following informalities:

In Claims 3 and 4, second lines, the words “patterened” should be “patterned”;

In Claim 10, second line, the word “thicnkess” should be “thicknesses".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim.

5. Claim 16 provides for method of assembling a microelectronic substrate, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a method without any active, positive steps delimiting how this method is actually practiced.

Claim 16 is also rejected under 35 U.S.C. 101 because the claimed recitation of a method, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4, 7-8 and 10-14 are rejected under 35 U.S.C. 102(d) as being anticipated by Izumi (US5459639).

Re Claim 1, Izumi shows and discloses

A microelectronic substrate comprising:

a body (11, fig. 2) having a first surface that includes a microelectronic component mounting site configured to receive a microelectronic component (14, fig. 2), a second surface separated from the first surface by a thickness (fig. 2), and an opening (opening in 11, fig. 2) extending through at least a portion of the thickness and being outwardly open at one or both of the first and second surfaces, the opening having a first portion (11B, fig. 2) having a first transverse

dimension (width of 11B, fig. 2) and a second portion (11A, fig. 2) having a larger second transverse dimension (width of 11A, fig. 2);

a thermally conductive member (15, fig. 2), which has a thermal conductivity greater than a thermal conductivity of the body (The heat radiation member may be made of a metal or a ceramics which has a high heat conductivity. [col.2, line 14]), received at least in part in the opening in the body (fig. 2), the thermally conductive member having a first thickness (of 15A, fig. 2) received in the first portion (11B, fig. 2) of the opening and a second thickness (of 15B, fig. 2) received in the second portion of the opening (11A, fig. 2), wherein a transverse dimension (width of 15B, fig. 2) of the second thickness is greater than the first transverse opening dimension (width of 11B, fig. 2).

Re Claim 2, Izumi shows and discloses

The microelectronic substrate of claim 1 further comprising microelectronic component (14, fig. 2) mounted on the mounting site and electrically coupled to the substrate (fig. 2).

Re Claim 3, Izumi shows and discloses

The microelectronic substrate of claim 1 wherein the body includes a patterned electrically conductive layer (13B, fig. 2) between the first and second surfaces.

Re Claim 4, Izumi shows and discloses

The microelectronic substrate of claim 1 wherein the body includes a patterned electrically conductive layer (13B, fig. 2) between the first and second

surfaces and the electrically conductive layer is thermally coupled to the thermally conductive member (fig. 2).

Re Claim 7, Izumi shows and discloses

The microelectronic substrate of claim 1 wherein the second thickness of the thermally conductive member comprises a radially extending flange (15B, fig. 2).

Re Claim 8, Izumi shows and discloses

The microelectronic substrate of claim 1 wherein the second thickness of the thermally conductive member-comprises a radially extending flange (15B, fig. 2) that extends about a periphery of the thermally conductive member (fig. 2).

Re Claim 10, Izumi shows and discloses

The microelectronic substrate of claim 1 wherein the first and second thicknesses of the thermally conductive member are integrally formed (fig. 2).

Re Claim 11, Izumi shows and discloses

A multi-layer printed circuit board comprising:

a first body layer (12B and /or 12C, fig. 2) having a first opening (11B, fig. 2) therethrough;

a second body layer (12A, fig. 2) juxtaposed with the first body layer and having a second opening (11A, fig. 2) therethrough, the second opening extending outwardly beyond a periphery of the first opening (fig. 2) to define an attachment surface (bottom face of the recess 11A, fig. 2) on the first body layer;

an electrically conductive layer (13B, fig. 2) disposed between the first and second body layers;

a thermally conductive slug (15, fig. 2) received in and extending between the first and second openings and thermally coupled to the electrically conductive layer (fig. 2), the slug including a transversely extending flange (15B, fig. 2) that is attached to the attachment surface (fig. 2).

Re Claim 12, Izumi shows and discloses

The printed circuit board of claim 11 wherein the flange of the slug is attached to the attachment surface by a thermally conductive cementitious material (solder 20, [col. 5, line 53]).

Re Claim 13, Izumi shows and discloses

The printed circuit board of claim 11 wherein the slug is electrically coupled to the electrically conductive layer (fig. 2).

Re Claim 14, Izumi shows and discloses

The printed circuit board of claim 11 wherein the flange of the slug is attached to the attachment surface by an electrically conductive cementitious material (solder 20, [col. 5, line 53]) that also electrically couples the slug to the electrically conductive layer (fig. 2).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izumi in view of Weber et al. (US5652463).

Re Claim 5, Izumi shows and discloses

The microelectronic substrate of claim 1,

Izumi does not disclose

the body opening includes a third portion having a third transverse dimension, the second transverse dimension being larger than the third transverse dimension and defining a transversely extending recess between the first and third portions.

Weber et al. teaches a device wherein

the body opening includes a third portion having a third transverse dimension (of opening of layer 7, fig. 1), the second transverse dimension (of opening of layer 6, fig. 1) being larger than the third transverse dimension (fig. 1) and defining a transversely extending recess between the first and third portions (window 13 pass through layer 5, 6, and 7 with the portion in layers 6 and 7 being larger than the portion in layer 5. [col. 5, line 23]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the third transverse dimension as taught by Weber et al. in the electronic device of Izumi, in order to have more

steps of layers for more circuit layer connections and be able to easier process in the circuit board of the electronic device.

Re Claim 6, Izumi shows and discloses

The microelectronic substrate of claim 5 wherein the second thickness of the thermally conductive member (15B, fig. 2) is received in the transversely extending recess (11A, fig. 2).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Izumi in view of Albrecht et al. (US6181561).

Re Claim 9, Izumi shows and discloses

The microelectronic substrate of claim 1,

Izumi does not disclose

the thermally conductive member further comprises a third thickness and the second thickness is disposed between the first and third thicknesses.

Albrecht et al. teaches a device wherein

the thermally conductive member further comprises a third thickness and the second thickness is disposed between the first and third thicknesses (the thermally conductive member having two steps, three thicknesses, [fig. 2B]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the shape of the thermally conductive member with two steps as taught by Albrecht et al. for the thermally conductive member in the electronic device of Izumi, in order to be able to more securely mounted to the circuit board, and since the particular claimed

configuration is just one of numerous configurations a person of ordinary skill in the art would find obvious for the purpose of providing mating surfaces. In re Dailey 149 USPQ 47, 50 (CCPA 1966). See also Glue Co. v. Upton 97 US 3.24 (USSC 1878).

Allowable Subject Matter

11. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claim 15 and all claims dependent thereof are allowable over the art of record because the prior art does not teach or suggest that a module or an apparatus having,

further comprising a third body layer juxtaposed with the second body layer and spaced from the first body layer, the third body layer having a third opening therethrough that is smaller than the second opening, wherein the flange of the slug is received between the first and third body layers.

The aforementioned limitations in combination with all remaining limitations of the respective claims are believed to render said claim 15 and all claims dependent thereof patentable over art of record.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US-6411516 US-6200407 US-6188579 US-6078101 US-5779134 US-4509096 US-5562971 US-5625227 US-6032355 US-5637832.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XIAOLIANG CHEN whose telephone number is (571)272-9079. The examiner can normally be reached on 7:00-5:00 (EST), Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on 571-272-2800, ext 31. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xiaoliang Chen/ Xiaoliang Chen

Examiner, Art Unit 2841

Examiner
Art Unit 2841